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DRYCO ACTIVATED ANTIRACHITICALLY

BY THE

ULTRA VIOLET RAY

THE DRY MILK COMPANY, 15 PARK ROW, NEW YORK
"An International Institution for the Study and Production of Pure Milk Products."

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Introductory

PROBABLY no discovery in the field of nutritional chemistry promises greater potential benefit to mankind than the discoveries of Hess(a) and Steenbock(b) that many food products are improved in dietetic and therapeutic properties by exposure to ultra violet light. The increased antirachitic and greater bone-forming properties imparted to milk by exposure to the activating rays is no longer a matter of conjecture lacking definite clinical and experimental proof. The universal interest in milk activated antirachitically by ultra violet light as a prophylactic and therapeutic agent in suppressing rickets is evidenced from the many published observations of clinicians and investigators throughout the world.

Closely following the publication of these new and important improvements in the nutritional properties of foods our Research Laboratories took steps to put into practical effect the results demonstrated in the laboratory.

We can thereby give to the public the benefits of these new and additional properties of milk, which Hess and Steenbock published as a result of their researches in nutrition laboratories.

(a) Hess, A. F., and Weinstock, M., Proc. Am. Pediat. Soc., June 7, 1924; abstracted in A. J. Dis. Child., 1924, xxviii, 256.

(b) Steenbock, H., Science, 1924, lx, 224.
Steenbock, H., and Black, A., Jour. Biol. Chem., 61:405, 1924.

Results from Activated Milk and Dry Milk

Hess⁽¹⁾ reported in May, 1925, that a rickets-producing ration could be converted into a rickets-protective ration by irradiating the dry milk previous to adding it to the diet of the animals. In the subsequent month he showed in an article in the *Journal of the American Medical Association*⁽²⁾ that rachitic infants which were fed irradiated dry milk could be cured by this food, as judged by the roentgenologic picture and the increase of inorganic phosphorus in the blood.

Kramer⁽³⁾ in the *American Journal of Diseases of Children* states that in a series of eight patients with active rickets, the administration of irradiated milk produced healing in every case. This was demonstrated at the end of the third week and was marked at the end of the fourth week. Irradiated milk feeding induced a marked retention of both calcium and phosphorus.

Hottinger⁽⁴⁾ confirms the antirachitic qualities of milk, human or cows', irradiated with ultra violet rays.

Cowell⁽⁵⁾ states that at the end of one month the Roentgenograms of the wrists of children who received one pint of irradiated Winter milk twice daily showed a decided increase in calcification.

Halac and Nassau⁽⁶⁾ claimed that milk irradiated with ultra violet light affords an effective remedy simple in application for rickets and tetany in infants. The authors show plainly what high medicinal value is given to raw milk by a simple and brief irradiation. The diseased condition of the children is completely relieved in two to three weeks by feeding them this irradiated milk. By their method they impart the remedial character of milk in an irradiation period of 45 seconds and reduction of the irradiation period to 25 seconds is possible.

Mackay and Shaw⁽⁷⁾ find that rapid healing of bone lesions in children can be brought about by dry milk irradiated with ultra violet light from the mercury arc.

György(8) irradiated dry milk and claims that it is a potent factor in curing uncomplicated rickets as well as tetany. Dry milk once irradiated may be retained with its full force for a long period of time. The antirachitic potency of irradiated dry milk makes it particularly suited for the prophylactic dietary in the treatment of rickets.

* * *

Dryco is Now Activated Antirachitically

In harmony with the progressive policies which have dominated the production of Dryco *we announce to the medical profession the improved Dryco—the first irradiated and antirachitically activated dry milk ever made available for the advancement of the nutritional and medical sciences.* The commercial production of activated Dryco is another concrete result of the progressive and idealistic policies which have long maintained the excellent merits of this preeminent food product.

In order to impart antirachitic and bone forming properties to Dryco, to the extent which makes it many times more potent as an antirachitic agent than natural milk or any other milk product now available, it has been necessary to overcome many obstacles. Long periods of experimentation involving many hundreds of test animals, hundreds of chemical analyses, mechanical ingenuity and the cooperation of leaders in the medical profession, has resulted in the perfection and adaptation of methods for irradiating Dryco in a manner which guarantees to the medical profession a distinctly convenient prophylactic and therapeutic milk for the suppression of rickets. Not only were numerous tests required to determine the conditions necessary to properly activate Dryco but the conditions of treatment had to be so adjusted that the usual undesirable effects attending activation of milk products were entirely eliminated. By the processes and methods used for activating Dryco the objectionable flavor and odor usually resulting from ultra violet light treatment of milk is entirely prevented. The keeping qualities of the product are not impaired as tests have shown that the activated product shows no evidence of deterioration after several months' storage. *Likewise the increased antirachitic potency of Dryco retains its effectiveness over long periods of time thus assuring to the consumer a product having the same properties as when freshly prepared. Of utmost importance in the application of irradiation methods for the activation of Dryco, is the fact that the vitamins are unimpaired in the activated product as treated according to our methods.*

Numerous Tests Show the Benefits Resulting From the Use of Activated Dryco

CHEMICAL ANALYSES OF BONE ASH

For the information of those desiring to have tangible evidence for comparison we include typical data taken from the numerous experiments made at our Research Laboratories showing the results obtained with activated and non-activated Dryco. The results as shown were all determined according to recognized standard technique and afford easy comparison for judging the merits of activated Dryco.

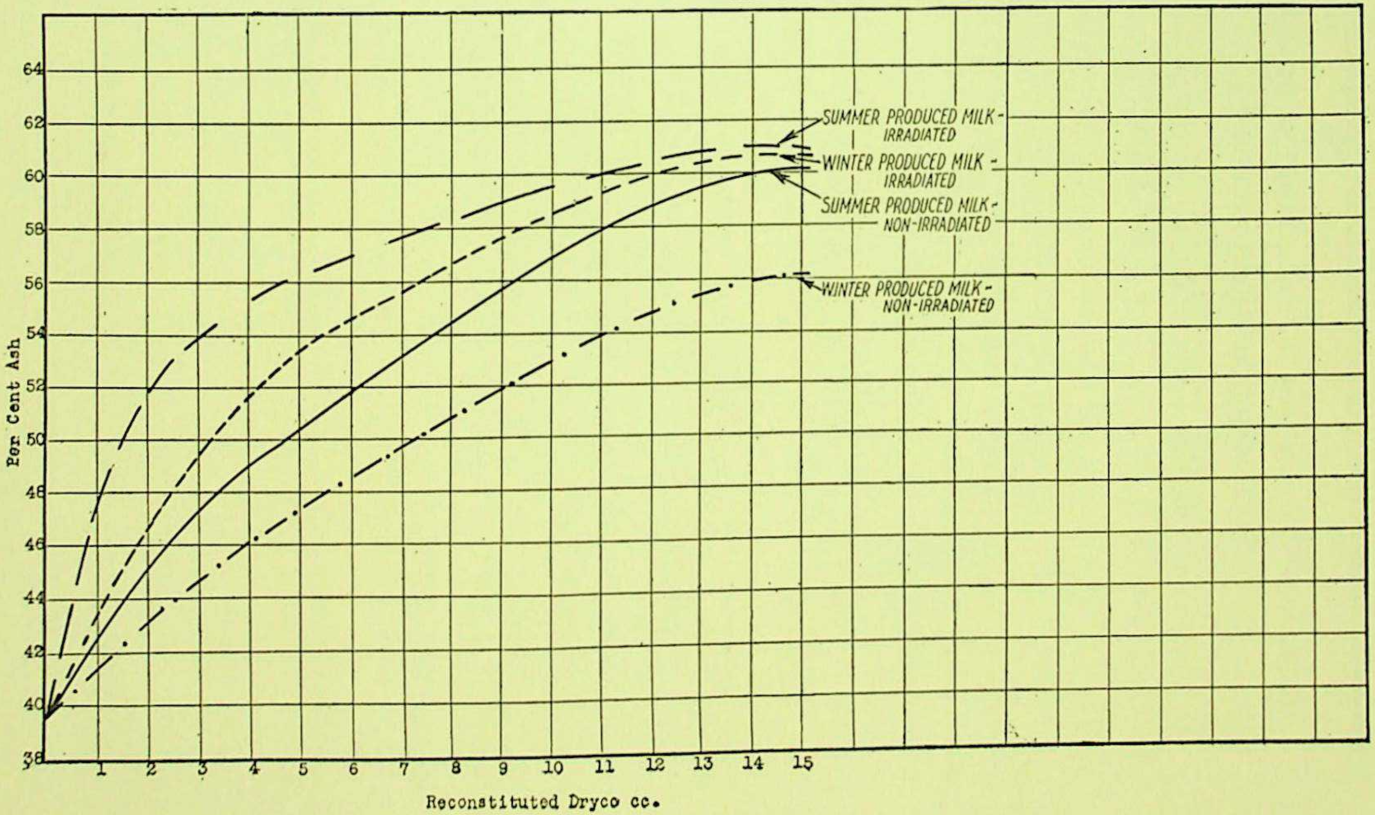
	Ash in Bones of Test Animal
Rachitic Ration + 2 cc., *Daily Activated Dryco*	50.19%
Rachitic Ration + 2 cc., *Daily Non-Activated Dryco*	42.29%
Rachitic Ration + 4 cc., *Daily Activated Dryco*	55.66%
Rachitic Ration + 4 cc., *Daily Non-Activated Dryco*	46.00%
Rachitic Ration + 7 cc., *Daily Activated Dryco*	58.04%
Rachitic Ration + 7 cc., *Daily Non-Activated Dryco*	49.62%
Rachitic Ration + 9 cc., *Daily Activated Dryco*	55.12%
Rachitic Ration + 9 cc., *Daily Non-Activated Dryco*	50.95%
Rachitic Ration + 15 cc., *Daily Activated Dryco*	60.22%
Rachitic Ration + 15 cc., *Daily Non-Activated Dryco*	56.08%

Activated Dryco for Combating Seasonal Appearance of Rickets

The greater tendency for manifestation of rickets in Winter months is a fact well known to physicians. This phenomenon is explained as being due to less exposure to direct sunlight during the cold and cloudy months. Our researches have shown that the natural antirachitic properties of milk during the Winter is also less than during the Summer. This fact of lower antirachitic potency of Winter produced milk coupled with less exposure of the infant to direct sunlight accentuates the rickets problem to a marked degree in Northern latitudes. In activated Dryco the normal antirrachitic potency of both the Winter and Summer produced milk is materially increased. The Winter produced milk made into Dryco and activated according to our methods has an antirachitic potency superior to both natural Winter and Summer produced milk. The chart on the opposite page, constructed from the analytical data obtained at our Research Laboratories, shows the greater potency of activated Dryco made from milk produced during Winter and Summer months.

Since the original publication of this information clinical tests which were started January 1, 1927, on a large group of babies, have shown that activated Dryco protected these babies against rickets. These tests were made by a leading clinician during the winter months and the babies were carefully examined and X-rayed periodically. There is, therefore, clinical proof in addition to the laboratory results that activated Dryco has marked antirachitic properties.

The effect of irradiation of Dryco on the ash content of bones of rats fed on milk produced in Winter as contrasted with that produced in Summer.

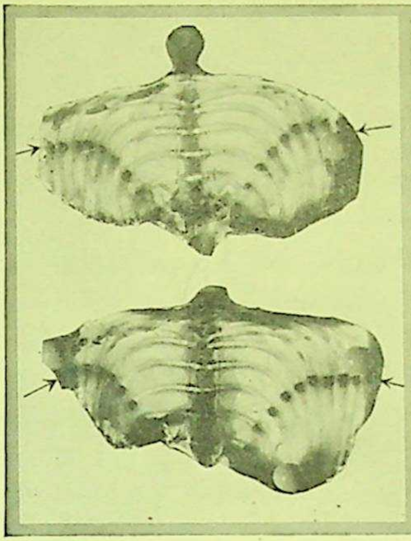


X-ray and Anatomical Diagnosis Confirm Antirachitic Potency of Activated Dryco

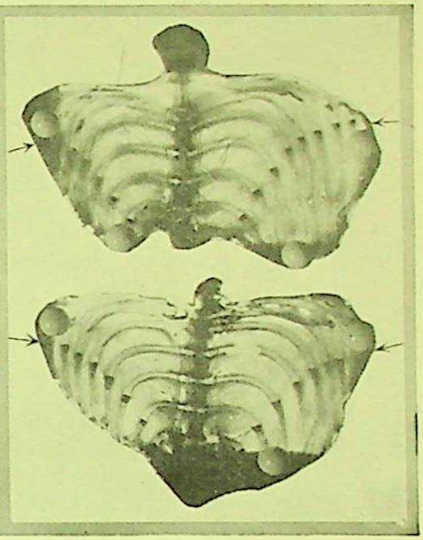
In the development of methods leading to the activation of Dryco reliance has not been placed solely on chemical methods. Radiographs and post-mortem diagnostic methods were used to check up on the results obtained from activated Dryco before it was offered to the public. Significant comparisons of results obtained with activated and non-activated Dryco are shown in the following table.

DIAGNOSIS FROM RADIOGRAPHS

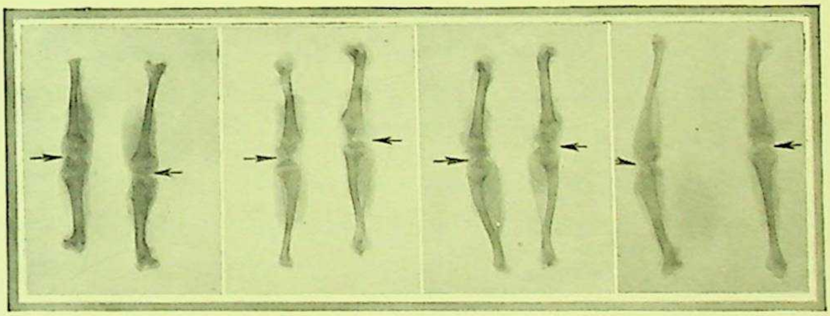
	RADIOGRAPHS	COSTO-CHRONDRAL JUNCTIONS
Rachitic Ration + 9 cc., *Daily Activated Dryco*	Rickets—Trace	Normal
Rachitic Ration + 9 cc., *Daily Activated Dryco*	Rickets—Negative	Normal
Rachitic Ration + 9 cc., *Daily Non-Activated Dryco*	Rickets—Moderate	Enlarged
Rachitic Ration + 9 cc., *Daily Non-Activated Dryco*	Rickets—Positive	Enlarged
Rachitic Ration + 4 cc., *Daily Activated Dryco*	Rickets—Negative	Normal
Rachitic Ration + 4 cc., *Daily Activated Dryco*	Rickets—Negative	Normal
Rachitic Ration + 4 cc., *Daily Non-Activated Dryco*	Rickets—Moderate	Enlarged
Rachitic Ration + 4 cc., *Daily Non-Activated Dryco*	Rickets—Moderate	Slightly Enlarged



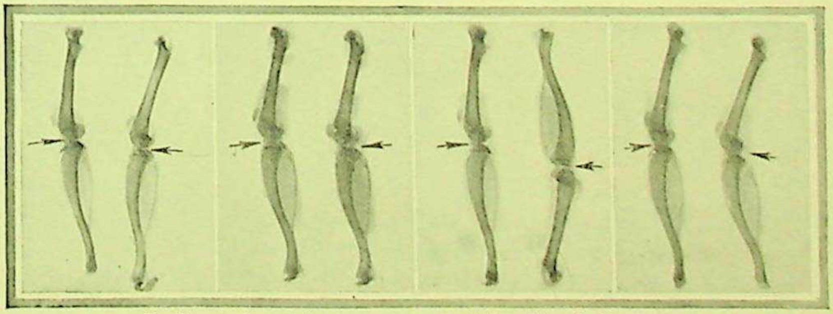
Costochrondral junctions of rats receiving Non-Activated Dryco.



Costochrondral junctions of rats receiving Activated Dryco.



Radiographs of bones of rats fed Non-Irradiated Dryco. Arrows point to enlarged epiphisis.



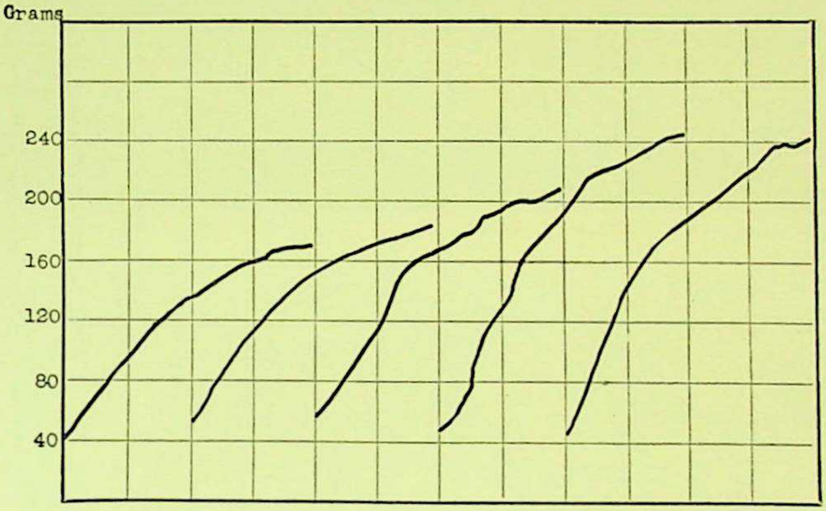
Radiographs of bones of rats fed Irradiated Dryco. Arrows point to normal epihisis

Sensitive Vitamins Are Unimpaired in Activated Dryco

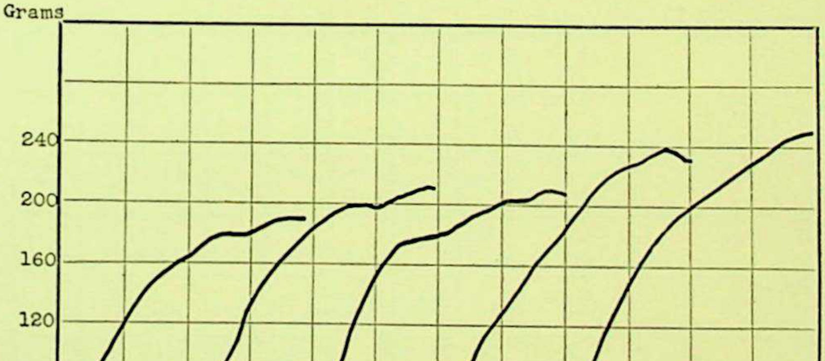
VITAMIN "A" RETAINS POTENCY IN DRYCO ACTIVATED BY OUR METHODS

The activation of Dryco according to the methods developed by us does not impair the potency of Vitamins "A" and "C." The long exposure periods of milk to ultra violet light used in many empirical studies in the past has possibly been detrimental to these vitamins. Recognition of this possibility necessitated much experimental work in the development of our methods of activation in order that these vital factors would remain as potent in activated Dryco as they are known to exist in the unactivated product. As a result of our application of the principle of ultra violet light irradiation in the production of activated Dryco, we are able to offer a dry milk product possessing all the natural milk vitamins unimpaired in potency as a result of either the dessicating operation or of antirachitic activation.

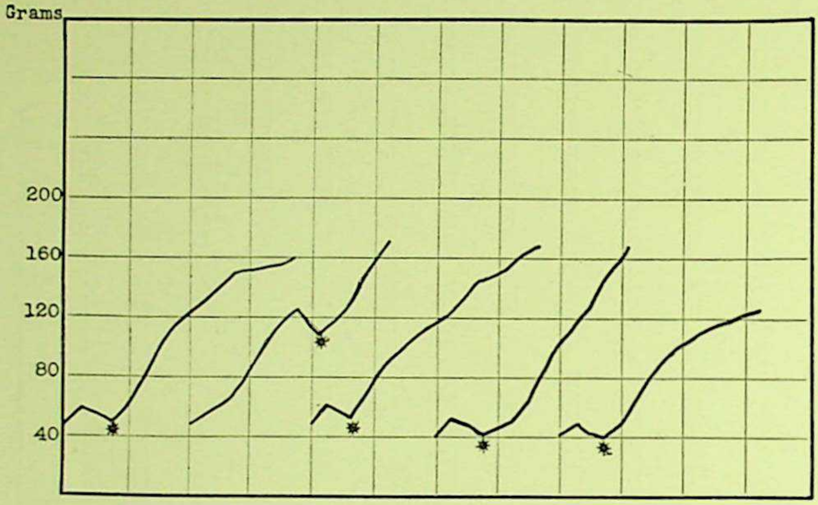
Even when experimental test animals are deprived of Vitamin A for a period of weeks with the resulting development of severe Xerophthalmia (specific indication of Vitamin A depletion) and loss in weight, immediate cure of the eye disease and resumption of growth takes place soon after the feeding of either irradiated or non-irradiated Dryco in small quantities daily.



Growth Curves of Rats Receiving Non-Irradiated Dryco.

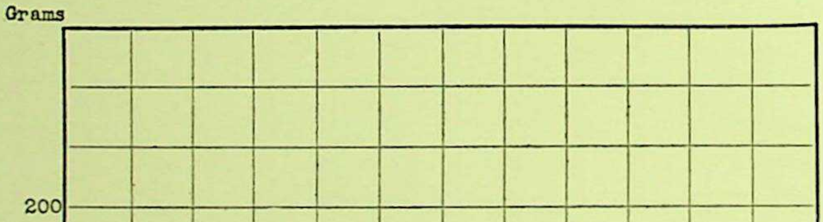


Growth Curves of Rats Receiving Irradiated Dryco as Sole Source of Vitamin "A." Growth is practically similar showing that Vitamin "A" is not impaired in Irradiated Dryco.



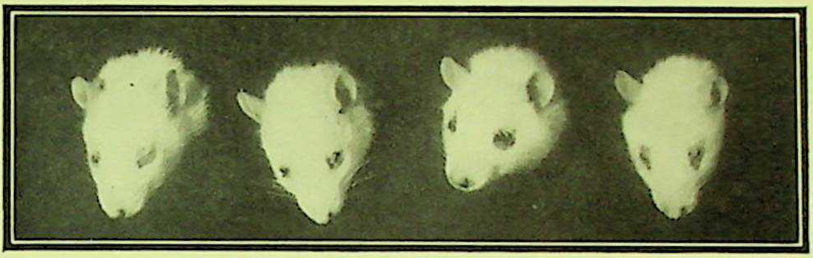
**Point at which Dryco feeding commenced.*

White Rats Resume Normal Growth after Vitamin "A" Depletion on Receiving Activated Dryco, showing Vitamin "A" Unimpaired.

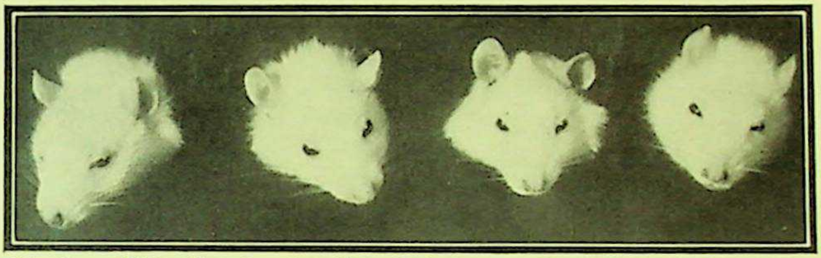


**Point at which Dryco feeding commenced.*

Growth Curves for White Rats Receiving Non-Activated Dryco after Vitamin "A" Depletion.



White Rats Showing Xeropthalmia as a Result of Vitamin "A" Depletion.

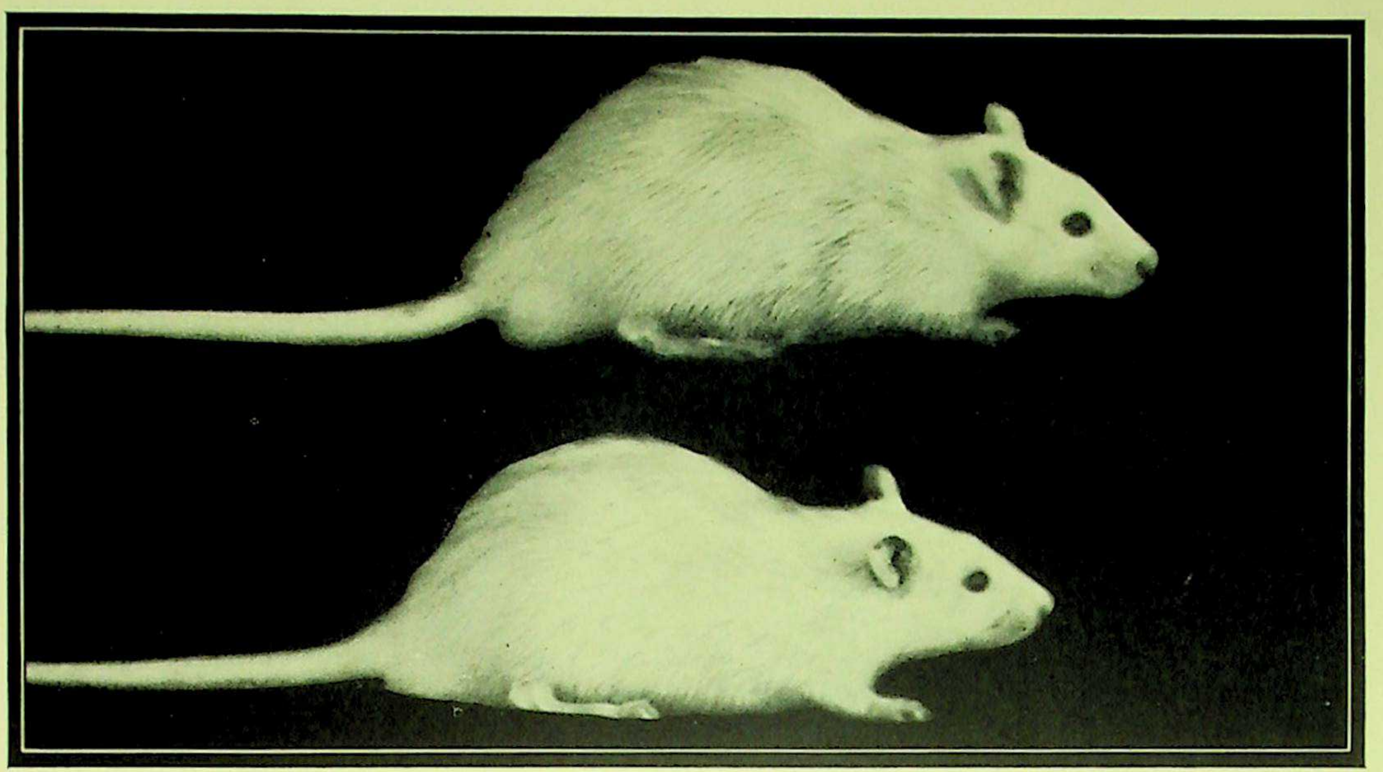


The Same White Rats Cured of Xerophtalmia After Receiving Small Quantities of Activated Dryco for 10 days, Showing Vitamin "A" Unimpaired in Activated Dryco.

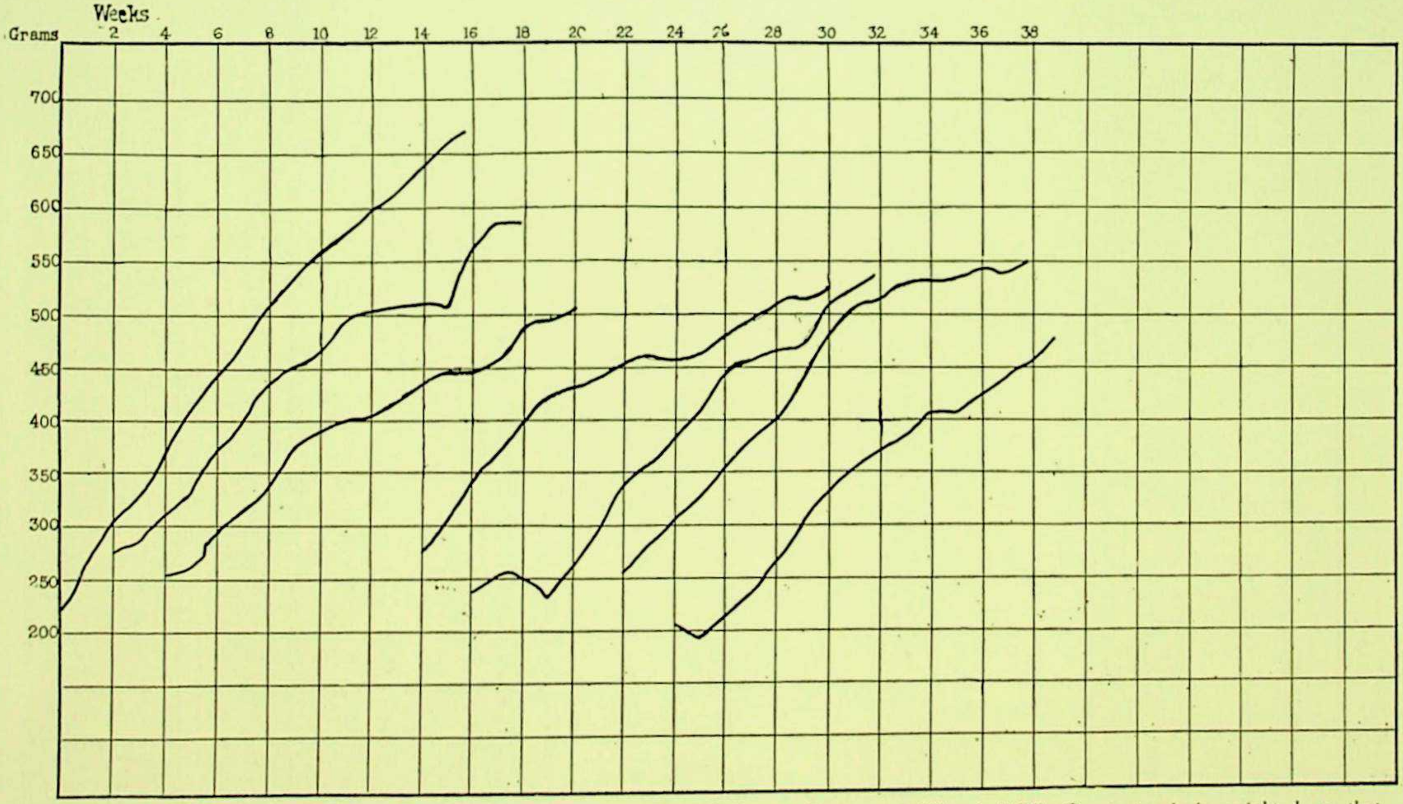
The accompanying photographs show the characteristic conditions manifested by severe Xerophthalmia resulting from Vitamin A depletion in white rats. The same series of photographs also show the complete cure of this characteristic eye disease, which is a specific indication of Vitamin A deficiency, after the feeding of small quantities of Dryco (not exceeding 10 cc.) for a period of 10 days.

The Antiscorbutic Vitamin "C" is Unimpaired in Activated Dryco

The potency of the Vitamin "C" in Dryco has been known and accepted among the medical profession for many years. The same degree of potency of this important vitamin exists in activated Dryco as heretofore. The growth of experimental guinea pigs and freedom from scurvy when receiving 80 to 90 cc. daily of activated Dryco, or the amount of liquid milk usually found to be necessary for protection against this disease, is shown in the accompanying charts.



The white rat at the top received small quantities of Non-Activated Dryco after the body store of Vitamin "A" had been depleted. The white rat at the bottom received the same quantity of Activated Dryco. The results show no impairment of Vitamins in Activated Dryco.



Growth curves of Guinea pigs receiving Irradiated Dryco, 80 cc. daily as sole source of Vitamin "C." Constant gain in weight shows that Vitamin "C" has not been destroyed in Irradiated Dryco.

Activated Dryco

Dryco activated antirachitically provides one of the most satisfactory and convenient agencies for the suppression of infantile rickets now available to the medical profession. Dryco activated embodies the usual high qualities of merit possessed by Dryco, with which pediatrists and physicians throughout the world have long been familiar, plus a greater prophylactic and therapeutic specificity for combating rickets than has heretofore been available in any natural milk food.

* * *

Activated Dryco retains its antirachitic qualities with positively no diminution for an indefinite period and will be offered to the public at no increase in price.

THE DRY MILK COMPANY
15 PARK ROW, NEW YORK

January 3, 1927

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